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tinins and immune bodies elaborated for each germ being nearly the same as in animals respectively inoculated with only one species.

II. I have prepared and used in man the following vaccines:

(1) Typhoid—paratyphoid A—paratyphoid B.

(2) Typhoid—Malta fever.

(3) Typhoid—paratyphoid A—paratyphoid B—Malta fever.

(4) Typhoid—paratyphoid A—paratyphoid B—B. asiaticus—B. columbensis.

(5) Typhoid—paratyphoid A—paratyphoid B—B. asiaticus—B. columbensis—Malta fever.

(6) Typhoid—paratyphoid A—paratyphoid B—dysentery Kruse-Shiga—dysentery Flexner—dysentery Hys Y—dysentery Flexner-like No. 1—dysentery Flexner-like No. 2.

(7) Cholera—plague.

(8) Cholera—plague—typhoid—paratyphoid A—paratyphoid B.

(9) Cholera—plague—typhoid—paratyphoid A—paratyphoid B—Malta fever.

III. The inoculation in man of the above combined vaccines is harmless. The reaction is not severe, with the exception of those containing plague germs, such as the "cholera-plague" and "cholera-plague-typhoid-paratyphoid A-paratyphoid B" vaccines, when the reaction is severe, though apparently rather less so than after Haffkine's simple plague vaccine.

IV. The combined vaccines I am now using consist of carbolized emulsions of agar cultures in normal salt solution without heating. These emulsions seem to give a less painful local reaction than broth cultures killed by heat. The presence of 0.5 per cent carbolic acid is sufficient to kill the germs. The "typhoid-paratyphoid A-paratyphoid B" vaccine is, however, also prepared by heating broth cultures at 53.

V. The individuals inoculated with the above-mentioned combined vaccines generally produce agglutinins for each species of bacteria, and the amount for each species is not much less than control individuals inoculated with simple "one disease" vaccines. The only exception, though only to a certain extent, seems to have been in the case of typhoid-dysentery vaccines.

VI. Combined vaccines, when efficient, are of practical advantage, saving a great deal of time and rendering possible a contemporaneous vaccination for several different maladies.

PUBLIC HEALTH ADMINISTRATION IN NEVADA.

By CARROLL FOX, Surgeon, United States Public Health Service.

The following report contains the results of a study of public health administration and organization in the State of Nevada, carried on through a period of six weeks.

During the course of the investigation eight towns, representing seven counties, were visited, namely, Reno and Sparks in Washoe County; Elko, Elko County; Winnemucca, Humboldt County; Goldfield, Esmeralda County; Tonopah, Nye County; Carson City, Ormsby County; and Virginia City, Storey County.

Nevada is a State having an area of 109,821 square miles. Much of this vast territory is semiarid except in small areas, here and there, which have been brought under irrigation.

The chief industries of the State are, first, mining; second, cattle and sheep raising; and third, agricultural pursuits in the irrigated districts and some dry farming.

Notwithstanding its immense area, the State had a population in 1910 of but 81,875, and it is somewhat questionable whether there has been any very marked increase since then. It must be remembered that mining towns are subject to vicissitudes that change the prosperous community of to-day into the deserted village of to-morrow. Increased immigration into a new section frequently means emigration from an old section. No State census has been taken, and information obtained locally is purely a guess. The new International Year Book for 1915 gives Nevada a population of 98,726 as of July 1, 1915. This is an estimate based on the increase for the previous 10 years. It is believed to be too high. At any rate, in computing death rates, etc., in the following report the population of 1910 is used.

There are no large cities in the State. Reno is the largest, with a population of approximately 11,000. All of the principal communities have railroad communication, but, the State being a country of magnificent distances, to reach certain points may require one or two days.

For information and assistance received in this study the writer is indebted to the secretary and members of the State board of health, the local health officers, and other State and county officials.

ADMINISTRATION AND ORGANIZATION.

As early as 1893 a law was enacted creating a State board of health and giving it rather comprehensive powers and duties of a public health nature, including the authority to promulgate and enforce regulations and providing a penalty for any violation thereof. Under this act the board of health, apparently not realizing the extent of the powers vested in it and being greatly handicapped by a totally inadequate appropriation, accomplished little except of a purely emergency nature.

In 1911 a vital statistics law was enacted. This law was patterned after the model law, but in addition provided for the creation of a State board of health along the lines of the law of 1893 and specified that such board was supreme in matters relating to the public health. This was followed in 1915 by an amendment making certain diseases reportable and requiring that physicians maintain quarantine.

After the passage of this amendment the board of health, in July, 1915, promulgated its first comprehensive regulations for the suppression of disease.

Composition and appointment of the board.—The board of health is composed of a president, a secretary, and one other member.

The president and secretary are appointed by the governor for a term of four years. Before being eligible for such appointment they must have been engaged in the regular practice of medicine in the State of Nevada for at least five years. This requirement does not apply to the third member of the board who is appointed by the governor, the president, and the secretary.

Meetings.—The State board of health is required to meet in Carson City on the first Tuesday in January and the first Tuesday in July of each year and at such other times as the president may deem advisable.

Duties and compensation of the members.—The president is required to preside over all meetings of the board and to perform such other duties as may be determined by the board. He receives a per diem of $20 for each day the board remains in session and necessary traveling expenses.

The secretary is required to keep the minutes of all meetings of the board and to attend to all correspondence; to proceed immediately to any locality when called upon by the local health officer for the purpose of eradicating and preventing the recurrence of any epidemic; to investigate epidemics when called upon by the State board of health; to record and tabulate all vital statistics and to issue semiannual bulletins; to make a biennial report to the governor and to compile the reports received from the various health officers.

The secretary receives a salary of $1,500 per year and is allowed the sum of $300 a year for a stenographer and a sum not to exceed $100 a year with which to provide a suitable office for the conduct of the affairs of the State board of health.

The third member of the board is required to attend all meetings of the board and to consult and advise with the board whenever called upon to do so. He receives a per diem of $20 for each day's attendance at a meeting and necessary traveling expenses.

Powers and duties of the board.—The State board of health is declared under the statute to be supreme in all health matters, and it is empowered to remove any deputy or local health officer for any violation of the provisions of law. It is further empowered to "take cognizance of the interests of life and health among the inhabitants of the State"; to "make or cause to be made sanitary investigations and inquiries respecting causes of disease, especially of epidemic and contagious diseases and the means of prevention; to investigate the sources of mortality and the effect of localities, employment, habits, and circumstances of life on the public health." The board is further empowered, upon request or when in its opinion the sanitary interests of the locality require it, to "advise with municipal, county, and township officers with regard to the location, drainage, water supply, heating and ventilation of public buildings, and the drainage and sewerage of towns and cities."

The board of health is likewise given the authority to promulgate and to enforce such regulations for the better preservation of the public health in contagious and epidemic diseases as it may judge necessary.

For refusing or neglecting to comply with any regulation of the board within 5 days after having received notice in writing, there is provided a fine of not less than $100 nor more than $500, or imprisonment for not less than 50 days nor more than 250 days.

It is made a duty of sheriffs, constables, and all peace officers to assist the board of health in enforcing the law and all rules, regulations, and requirements promulgated by the board.

Under the law every incoming governor has the power to change the composition of the entire board, including the secretary. Experience has shown that effective public health work can not be carried on by untrained men, and it is not conducive to efficiency to supplant at one time all of the experienced men by others who will in all probability lack that qualification. This statement applies most emphatically to the secretary, who should receive his appointment from the board of health and whose tenure of office should be based on efficiency and not political expediency.

The secretary.—The present secretary of the board is to all intents and purposes a full-time health officer, as he has given up practically his entire private practice. His salary is $1,500 per annum, and because he performs his own stenographic work and his private office is the official office of the board of health he is permitted to retain the small fund allowed by law for stenographic services and office rent. There are not sufficient funds to employ capable assistants in either the office or the field, and when the manifold duties of a health department are vested in one man their accomplishment is difficult or impossible.

EPIDEMIOLOGICAL ACTIVITIES.

Morbidity Reports.

Requirements of law.—The provisions of law requiring the notification of diseases are summarized as follows:

It is made the duty of the attending physician to report to the local health officer every case of scarlet fever, smallpox, diphtheria and membranous croup, typhus fever, typhoid fever, whooping cough, measles, chicken-pox, pneumonia, tuberculosis, bronchitis, acute anterior poliomyelitis, cerebrospinal meningitis, diarrheal diseases of children, cancer, puerperal septicemia, mumps, and Rocky Mountain (tick) fever.

For failure so to report there is provided a fine of not less than $100 nor more than $500, or imprisonment for not less than 10 days nor more than 30 days, or both fine and imprisonment.

Requirements of regulations.—Acting on the above provision of law and other powers conferred upon it, the State board of health promulgated in July, 1915, certain regulations, of which the following is a summary:

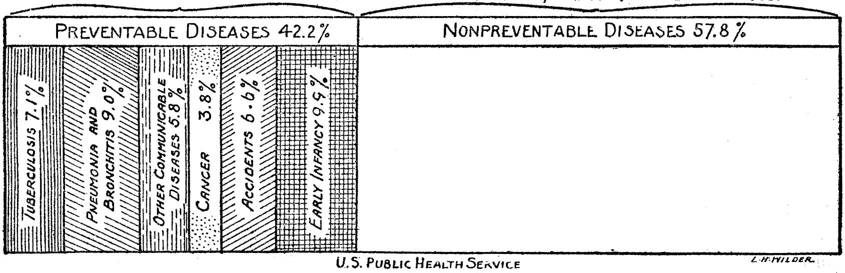
It is the duty of the attending physician immediately to report to the local health officer all of those diseases mentioned in the law as reportable.

It is the duty of the local health officer daily to transcribe into the "Register of reportable diseases" all of the data furnished by the attending physician, as well as certain information relating to the date of placarding, the date of the establishment of quarantine, the date of release of quarantine, the date of finding the first and second consecutive negative culture, the date of disinfection, etc.

The local health officer is required to transmit monthly to the secretary of the State board of health the original morbidity reports received by him during the previous month.

Discussion.—Previous to the passage of the above law and regulation, physicians had been submitting to the county health officers monthly statements of the communicable diseases under their care, and county health officers had been submitting to the State health officer monthly summaries of the cases of, and deaths from, the communicable diseases occurring in the county during the previous month. These reports were greatly lacking in important information.

SHOWING THE PERCENTAGE OF DEATHS FROM PREVENTABLE DISEASES, YEAR 1914. TOTAL DEATHS 963.



U.S. PUBLIC HEALTH SERVICE L.H. WILDER.

The present law is faulty in that it does not require householders or heads of families to report diseases. The entire responsibility is placed on the physician. The law also neglects to state the time limit for reporting diseases. This has been provided for by regulation.

While the present law is not ideal, it is a great improvement over the old system, and its enforcement should result in securing more complete information regarding the prevalence of disease.

One of the most prevalent and fatal diseases occurring within the State is pneumonia. During the 12-month period ended June 30, 1915, it was reported from every county, there having been a total of 315 cases notified, with 69 deaths, for the entire State. This gives a death rate per 100,000 of 84.3 and a case fatality rate of 22 per cent. Of scarlet fever there were 185 cases reported, with 2 deaths, or a death rate per 100,000 of 2.44 and a case fatality rate of 1.08 per cent. There were 190 cases of typhoid fever reported, with 10 deaths, or a death rate per 100,000 of 12.2 and a case fatality rate of 5.26 per cent. The number of reported cases of diarrheal diseases of children was for the same period 481, with 27 deaths, or a death rate for 100,000 of 33 and a case fatality rate of 5.6 per cent. There were 10 cases of Rocky Mountain fever, with 4 deaths.

A study of the morbidity reports would justify one in concluding that, except for some of the minor communicable diseases, notifiable diseases were being reported fairly well. A notable exception, however, is diphtheria. During the first six months of the period under consideration there were but 2 cases reported, with 1 death, and during the last six months not a case was reported, although an examination of the records of the hygenic laboratory for the same months shows that there were 9 positive cultures examined. Were the laboratory a part of the health department and therefore in close touch with all of the activities of that department, the records of one could be made equally valuable to the other.

The Control of Disease.

Requirements of law.—The following is a summary of the law providing for the establishment and maintenance of quarantine:

It is made the duty of every physician attending a case of scarlet fever, smallpox, diphtheria, and membranous croup, whooping cough, measles, chicken-pox, acute anterior poliomyelitis, cerebrospinal meningitis, diarrheal disease of children, puerperal septicemia, or mumps, forthwith to establish and maintain a quarantine in conformity with the regulations promulgated by the State board of health.

Any physician who fails to establish and maintain such quarantine is liable to a fine of not less than $25 nor more than $100, or imprisonment for not less than 10 days nor more than 100 days, or by both fine and imprisonment.

Requirements of regulations.—In conformity with the above law, the State board of health at the meeting held July, 1915, promulgated certain regulations, of which the following is a summary:

For purposes of control the notifiable diseases are classified as follows:

To be quarantined:
  Scarlet fever.
  Diphtheria and membranous croup.
  Smallpox.
  Anterior poliomyelitis.
  Cerebrospinal meningitis.
To be placarded:
  Typhoid fever.
  Diarrhea of children.
  Chicken-pox.
  Whooping cough.
  Mumps.
  Measles.

Reportable only:
- Pneumonia.
- Tuberculosis.
- Bronchitis.
- Typhus fever.
- Rocky Mountain (tick) fever.
- Puerperal septicemia.
- Cancer.

It is made a duty of the attending physician in whose practice a case of communicable disease has occurred to instruct the family as to how the spread of the disease may be prevented and to furnish a copy of the rules and regulations of the State board of health governing quarantine.

Quarantine is established by serving a written notice, signed by the local health officer, upon the head of the household and placarding the house with a card bearing the word "Quarantine" and a statement to the effect that persons are forbidden to enter or leave the premises.

It is made a duty of the attending physician, when delegated by the local health officer, to establish and maintain quarantine by serving the notice and placarding the house.

Notices are served in duplicate, the original being left with the householder and the duplicate being returned to the local health officer, signed by the person serving the notice, who is also required to indorse thereon certain data relative to the date and hour served, etc.

All pet animals must be excluded from rooms occupied by infected persons in quarantine. Upon the completion of quarantine it is required that all rooms occupied by infected persons and all bedding, clothing, or other articles contained therein be disinfected.

It is made a duty of the attending physician, when delegated by the local health officer, to perform the necessary disinfection.

No letters or other articles may be mailed without permission from the local health officer. Provision is made for disinfecting such letters before mailing.

No person is permitted to enter or leave premises under quarantine except as specially provided for by the rules and regulations.

Adults and children who have previously had the disease may be permitted to leave quarantined premises, but may not reenter until the quarantine is raised, except in the case of smallpox, when no unvaccinated person may be released before the end of the quarantine, and in the case of diphtheria, when no person in whose throat virulent bacilli are found may be released before the end of the quarantine period.

Where possible, persons suffering from a quarantinable or placardable disease should be rigidly isolated, in a suitable room, from other members of the household, and all dishes, bedding, and the like and the secretions from the patient's throat and nose must be disinfected before being removed. Where the conditions are such as to render the taking of proper precautions difficult or uncertain, the local health officer may apply to the local board of health for an order to remove the patient to the isolation ward of the county hospital.

The sale of milk or dairy products from quarantined or placarded premises is prohibited, unless in the opinion of the local health officer the conditions are such that the products can be kept free from contamination.

Wage earners may be permitted to attend to their usual vocation when they are protected by either a natural or acquired immunity or, in the case of diphtheria, when a negative culture has been obtained from the nose and throat: *Provided*, That the patient is properly isolated, that proper precautions are taken to change the clothes when entering and leaving the house, and that the wage earner is not engaged in any business which brings him in contact with children.

Scarlet fever.—Quarantine must be maintained until the complete recovery of the patient, including recovery from all sequelæ of the disease.

If the disease terminates in death or the patient be removed from the premises, the quarantine may be released, except that where there are susceptible children present, it must be maintained for 5 days following the death or removal. Under no circumstances may quarantine be released until after the disinfection of the patient and room.

Diphtheria.—Quarantine must be maintained until two successive negative cultures from the nose and throat, taken not less than 24 hours apart, are reported to the local health officer from the hygienic laboratory.

If the bacilli persist in the throat or nose after a period of 28 days a virulence test may be made. The presence of a nonvirulent organism is considered equivalent to a negative culture.

Where the cultural method for the release of quarantine is not used, quarantine must be maintained for 28 days from the beginning of the last case on the premises.

If the disease terminates in death or the patient is removed from the premises, the quarantine may be released except where there are susceptible children present, when it must be maintained for 7 days longer. However, if the children have recently received immunizing doses of antitoxin and one negative culture has been obtained from the nose and throat, quarantine may then be raised.

In no case may quarantine be raised until the proper disinfection has been performed.

Smallpox.—Quarantine must be maintained until the complete recovery of the patient as determined by the disappearance of all crusts.

Contacts may be released after disinfection if they have had smallpox or if they have been successfully vaccinated within 3 years.

In no case may quarantine be raised until the proper disinfection has been performed.

If the disease terminates in death or the patient is removed, quarantine must then be maintained for 2 weeks from the date of death or removal.

Cerebrospinal meningitis and anterior poliomyelitis.—Quarantine must be maintained until the recovery of the patient from the acute symptoms.

Where the disease terminates in death or the removal of the patient, quarantine may be released after 10 days from date of death or removal.

In no case may quarantine be raised until the completion of the required disinfection.

Disinfection.—The regulations go into detail as to the kind of disinfectant and the methods of application.

For the disinfection of the body a 2 per cent solution of carbolic acid or a 1 to 3,000 solution of bichloride of mercury is required.

For room disinfection it is required to use for every 1,000 cubic feet:

	Ounces.
Formalin (40 per cent formaldehyde)	11
Water	11
Potassium permanganate (fine crystals)	9

Placarding.—By placarding is meant posting on the infected premises a card containing the word "Warning" and a statement that persons may not enter the premises.

It is the duty of the local health officer to placard, or he may delegate the physician or any peace officer to do the same.

Persons under the age of 21 living in a house where there is a case of chicken-pox, measles, or whooping cough are prohibited from attending any school, church, Sunday school, or public gathering of any sort.

Chicken-pox.—Local health officers must satisfy themselves that a mild case of smallpox has not been erroneously diagnosed chicken-pox.

Placards must remain on the house until 21 days from the date of onset of the last case on the premises.

Measles.—If there are other susceptible persons on the premises, the placard must remain posted for 3 weeks from the date of onset of the last case on the premises. If not, placards may be removed at the end of 2 weeks from the date of onset.

Mumps.—The placard must remain posted on the premises for 3 weeks from the date of onset of the last case.

Whooping cough.—The placard must remain posted on the premises for 6 weeks from the date of onset of the last case.

Typhoid fever and diarrhea of infants.—The placard must remain posted until complete recovery of the patient.

It is made a duty of the attending physician to instruct the nurse or attendant to disinfect the feces and urine by mixing a cupful of chloride of lime with each passage and allowing the disinfectant to stand in contact with the excreta for one hour before being disposed of.

If in the opinion of the local health officer the discharge of the above duty is difficult or unsatisfactory, he is required to apply to the county board of health for an order to remove the patient to the isolation ward of the county hospital.

Discussion.—These regulations have been in effect such a short time that it is impossible to state what practical results may have accrued from their enforcement. However, they will certainly make quarantine procedure uniform throughout the State, a thing greatly to be desired.

On account of peculiar local conditions the responsibility of establishing and maintaining quarantine and giving the necessary instructions to prevent the spread of the disease has been to a large extent placed with the attending physician. Until more efficient local health departments can be secured this is probably a wise provision. However, one must not expect too much from the best regulations unless they are enforced by a skilled health officer with the invaluable assistance of his epidemiologist and public health nurse.

It is thought that in the regulations too much stress is laid upon the necessity for terminal fumigation as compared with the more important disinfection of discharges during the course of the disease.

It is also thought that the penalties imposed against the physicians are rather great and that there should be a penalty provided for any person who violates any provision of the regulations.

Rabies.—Rabies is becoming a serious menace to the people of some sections of the State of Nevada. It is supposed to have been introduced from Idaho, where some one, believing that the coyote could be exterminated by inoculating with rabies virus, attempted the experiment, with the result that the disease has spread over several States. Dogs and a number of persons have been bitten.

The State board of health of Nevada, appreciating the danger, recommended to the municipalities in the presumably infected zone that all dogs be muzzled. The towns passed the necessary ordinance, and it was satisfying to note that in Winnemucca and Elko the ordinance was being enforced. The State board of health has requested the cooperation of the biological survey, which has promised to place a hunter in the field.

The Pasteur treatment is administered at the hygienic laboratory of the university, antirabic virus being obtained from the United States Public Health Service.

The common drinking cup, etc.—In addition to the regulations summarized above the State board of health has promulgated regulations abolishing the common drinking cup and common towel on vehicles of common carriers in intrastate traffic and also providing for the cleanliness and purity of ice and water used on such vehicles.

THE HYGIENIC LABORATORY.

The hygienic laboratory was established in 1909 by legislative enactment to aid physicians and health officers in the diagnosis of "infectious" diseases and for research into the nature, cause, and control of such diseases.

Since its inception, the laboratory, in addition to assisting in the diagnosis of communicable diseases, has made bacteriological examinations of milk and water as well as sanitary surveys in connection with town water supplies, and has carried on epidemiological studies in the case of typhoid fever, dysentery, and other diseases. The laboratory has, in fact, been assuming the functions of a health department, and yet for purposes of administration it was placed under the control of the regents of the University of Nevada instead of being made a part of the State board of health, to which it logically belongs.

There is by accident, so to speak, a remote connection between the laboratory and the board of health, inasmuch as the bacteriologist of the laboratory was appointed third member of the board.

The laboratory is under the immediate direction of a veterinarian, the professor of veterinary bacteriology at the university. He receives, in addition to his regular salary, $600 from the laboratory fund. There is also employed a full-time bacteriologist, who receives $2,400 per year and upon whom falls the actual work of the bacteriological examinations, as well as of the field investigations. There is one laboratory attendant employed. To defray the expenses of the laboratory there is appropriated $5,000 per year.

During the last year and a half the work of the laboratory has greatly increased, there having been made 777 examinations in 1914, representing a cost per examination of $6.43. This is a marked improvement over previous years, as in 1913 there were made 386 examinations, at a cost per examination of $12.95, and in 1912 but 276 examinations, at a cost per examination of $18.11. During the first half of the present year (1915) there were made 1,147 examinations, representing a cost per examination of but $2.17. Thus with the completion of the year 1915 the cost per examination will approximate a figure more consistent with economical maintenance.

Previous to 1914 the official work of the laboratory was confined almost entirely to the diagnosis of typhoid fever, tuberculosis, diphtheria, and malaria, with the occasional examination of samples of milk and water. Since that time its scope has been greatly increased and made to include Wasserman reactions, examinations of pus, blood, etc., the manufacture of typhoid and autogenous vaccines, and in fact many other laboratory facilities have been extended to the practicing physicians and health officers, all of which explains the increasing desire on the part of physicians to avail themselves of the opportunities offered.

The laboratory furnishes outfits for the submission of samples for examination and reports to physicians the results of such examinations by telephone or telegraph when requested or practicable, as well as by regular report cards, keeping a proper file for future reference.

From the standpoint of the public health the hygienic laboratory can never be of the greatest value to the State until it is made a part of a properly organized health department. It is to be hoped, therefore, that the next legislature will desire to see its State health organization strengthened so that it will be, though small, at least equal in efficiency to that of other States and capable of acting along modern lines. A reorganization with this end in view would mean the formation of a State health department and a transfer of that most necessary and important adjunct, the laboratory and its equipment, from the control of the board of regents of the university to the control of the board of health of the State department of health.

It is hopeless to expect to eradicate the preventable diseases, the control of which is the entire function of a health department, until all of the forces engaged are correlated and placed under one controlling head.

PUBLIC HEALTH ENGINEERING.

Activities along this line of public health have been sadly neglected in Nevada, principally because the State board of health has never had sufficient funds to employ the necessary expert assistants to carry on the work.

There is indeed little law governing public or private water supplies used for domestic purposes or controlling sewerage systems, although the board of health is empowered to advise with local authorities in regard to the drainage and sewerage of towns and cities and could, under the provisions of law empowering it to investigate the causes of disease, make the necessary surveys of water supplies.

An effort has been made on the part of the hygienic laboratory to carry on sanitary surveys of water supplies, but without the services of a sanitary engineer the results obtained are not likely to be entirely satisfactory.

In a recent inspection made by the writer of several towns in the State the great need for sound advice in connection with local sewerage systems was most apparent. There was hardly a town inspected that did not have its sewerage problem, in the solution of which a sanitary engineer from the State health department would have been of the greatest assistance at no expense to the locality. In fact, the advisory and supervisory assistance that such a State official would be able to give would frequently result in a great saving of money to the community.

Every town visited was sewered. In two instances the sewage was passed into a river untreated. In two instances the sewage flowed into a river after passing through a septic tank. In neither instance did the septic tank seem to be carrying out its function properly. In three instances the sewage passed into the sands of the desert—apparently a more or less satisfactory method of disposal. In one instance the sewage was used for irrigating.

In general it may be said that the water supplies of the different communities are comparatively pure. They are all owned by private corporations. A proper supervision over these supplies so that their purity may be maintained should be exercised by the State board of health. This matter is easy to control at the present time while the population is sparse, but as irrigation projects are completed and the rural population of a permanent nature increases, the water and sewerage problems will become much more difficult to handle.

The methods used for the collection and disposal of garbage in the different communities are primitive and would bear investigation by a State sanitary engineer.

There is a State law which provides for the abatement of nuisances in unincorporated towns. It is summarized as follows:

For the purposes of the act, nuisances are deemed to consist of permitting filth heaps, garbage, unprotected sewerage or drainage pipes or boxes, cesspools, etc., and such other nuisances as may be specified by the State or county board of health, to remain unabated after due notice has been given to abate or remove the same.

The law further states the methods of procedure in order to secure the abatement of a nuisance, and in the event of an order not being obeyed authorizes the local authorities to abate the nuisance and charge the cost as a lien against the property.

REGISTRATION OF BIRTHS, DEATHS, AND MARRIAGES.

The registration of births and deaths is carried out under the provisions of an act passed in 1911. As this act conforms closely to the model law proposed by the Bureau of the Census, it is not thought necessary to summarize it here.

The State health officer is State registrar of births and deaths, and the county health officers are local registrars. The local registrars regard the practicing physicians of the county as deputy registrars, but few have officially received the appointment as such, and these would, therefore, not be entitled to any fees allowed by law.

To expedite the business of registration and increase the returns it would seem advisable to appoint a number of deputy registrars for each county.

During the year 1914 there were registered 963 deaths (exclusive of stillbirths), which gives a death rate for the State of 11.7.

It is generally believed by local registrars that practically all of the deaths are certified, that the practicing physicians are conscientious in fulfilling this obligation to the State, and that a death, even though it may occur far removed from the centers of population, is sooner or later brought to the attention of the registrar.

During the year 1914 there were 1,327 births registered, exclusive of stillbirths. This gives a birth rate of 16.2. This low birth rate is not inconsistent with local conditions. The conditions incident to mining camps are such that there is always a large preponderance of unmarried males comprising the population. It is quite unfair to compare either the birth or the death rate of a State like Nevada with the rates of more settled agricultural communities.

During the year 1914 there were registered 95 deaths in children under 1 year (exclusive of stillbirths), which, compared with 1,327 births for the same period, would give an infant mortality of 71.5.

Of the 963 deaths registered in 1914 fully 408, or 42.2 per cent, should be classed as preventable, and should therefore receive the attention of the health department.

Report of marriages.—There is a provision of law which requires that county clerks transmit to the secretary of the State board of health on or before the 10th day of January and the 10th day of June of each year the number of marriage licenses issued by them during the preceding six months.

Tabulation of information relating to the registration of births, marriages, and deaths, State of Nevada, 1914.

County.	Population.	Area (square miles).	Number of registrars.	Number of deputy registrars.	Number of physicians.	Number of embalmers.	Number of birth certificates.[1]	Number of death certificates.[1]	Cost.	Number of marriages.	Stillbirths.
Churchill	2,811	5,050	1	0	5	1	54	46	......	34	1
Clark	3,321	8,045	1	0	4	1	81	35	......	37	1
Douglas	1,895	733	1	0	5	0	44	11	......	19	1
Elko	8,133	17,059	1	0	8	2	161	87	......	65	2
Esmeralda	7,869	7,432	1	0	6	1	91	65	......	38	4
Eureka	1,830	4,157	1	0	1	1	27	17	......	8	1
Humboldt	6,825	15,857	1	1	12	3	103	54	......	54	3
Lander	1,786	5,721	1	0	2	1	23	23	......	7	0
Lincoln	3,489	10,511	1	0	4	1	47	30	......	0	1
Lyon	3,568	1,509	1	0	5	1	61	48	......	36	2
Mineral	1,500	....	1	0	5	1	11	19	......	17	0
Nye	7,513	18,294	1	1	9	4	121	78	......	88	1
Ormsby	3,415	156	1	0	6	4	33	51	......	38	1
Storey	3,045	251	1	0	1	1	33	50	......	12	0
Washoe	17,434	6,251	1	1	40	6	283	271	......	249	5
White Pine	7,441	8,795	1	0	8	2	154	78	......	76	6
Total	81,875	100,821	16	3	121	30	1,327	963	......	778	29

[1] Exclusive of stillbirths.

LOCAL HEALTH AUTHORITIES.

Requirements of law.—The requirements of law relating to the appointment of local boards of health and local health officers are summarized as follows:

The county board of health consists of the county physician, the sheriff, and the board of county commissioners. The county physician acts as chairman.

This board of health acts in conjunction with, and under the supervision of, the State board of health.

The duties of the county board of health are to "oversee all sanitary conditions" of the county and to "supervise, control, and enforce such health regulations as will best subserve the health and cleanliness" of the county.

In cases of emergency where immediate action is necessary the county board of health may act independently of the State board of health, reporting its action at once to that board.

For neglecting to comply with any regulations as contemplated above, within 5 days after receiving notice in writing, there is provided a fine of not less than $50 nor more than $200, or imprisonment for not less than 25 days nor more than 100 days, or both fine and imprisonment.

The board of county commissioners is required to appoint a county health officer to act for a period of not less than one year, who may be removed only for incompetency.

The duties of the county health officer are to act as local registrar and to record cases of the communicable diseases reported by physicians.

For collecting and compiling the vital statistics of the county the local registrar must be given by the county a salary of not less than $25 per month.

With the approval of the county commissioners, the local health officer may appoint one or more deputy health officers, who are entitled to a salary of not less than $25 per month or, in lieu of such, a fee of $1 for each birth and death certificate executed by them.

Discussion.—There are 16 counties and in each county there is a county health officer, who receives a salary of from $25 to $50 per month for his services as county registrar, but no salary as health officer. Frequently the county health officer is also county physician and receives an additional compensation for his services in that capacity.

As health officer the duties are not onerous, and consist of the registration of births and deaths, the recording of morbidity reports, and in general a supervision of the communicable diseases. In a few instances the health officer attempts some supervision over the milk supply and in a small way some health supervision of schools.

In Reno, the largest city in the State, there has been created a board of health consisting of three members, each of whom has assumed certain duties. One is health officer, one secretary, and one milk inspector. In this way certain functions of a health department are carried out.

Few of the towns are incorporated. The county health officer usually acts as health officer for the county seat.

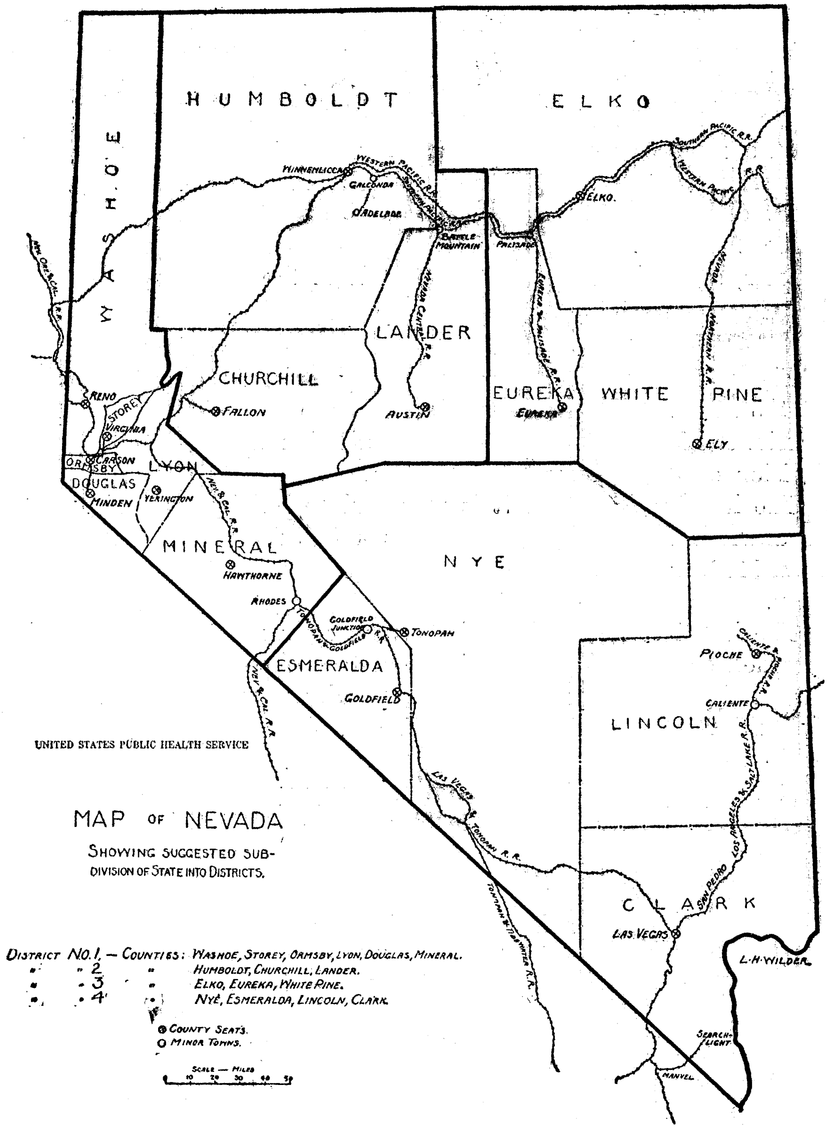
If the small population of the State were concentrated, one full-time health officer would be sufficient. It is not, however. It is divided into small but important and prosperous communities, which are scattered over an immense area.

Taking into consideration the public health needs of the State as a whole, its great size, transportation facilities, and the importance, prosperity, and location of its various centers of population, it would seem advisable to divide the State into not less than four districts, in each of which should be placed a full-time health officer to assume the responsibility of enforcing all public health laws and regulations within his district. Provisionally, the State might be divided as follows:

- District No. 1:
    - Washoe County.
    - Storey County.
    - Ormsby County.
    - Lyon County.
    - Douglas County.
    - Mineral County.
- District No. 2:
    - Humboldt County.
    - Churchill County.
    - Lander County.
- District No. 3:
    - Elko County.
    - Eureka County.
    - White Pine County.
- District No. 4:
    - Nye County.
    - Esmeralda County.
    - Lincoln County.
    - Clark County.

The salary and expenses of the district health officer could be paid by the different counties comprising the district without placing much of an extra financial burden on any one community.

For instance, at the end of the year 1914 Elko County had a balance, after all debts were paid, of approximately $250,000, Humboldt County a balance approximately of $48,000, Nye County a balance of approximately $90,000, Ormsby County a balance of approximately $26,000, Storey County a balance of approximately $9,400, Washoe County a balance of approximately $290,000, and White Pine County a balance of $80,439.



UNITED STATES PUBLIC HEALTH SERVICE

MAP OF NEVADA

SHOWING SUGGESTED SUB-DIVISION OF STATE INTO DISTRICTS.

County and deputy health officers would have to be appointed as under the present law, as well as a deputy health officer in each town, who need not necessarily be a physician. They would act in their present capacity as local registrars and would assist the district health officer in emergencies and keep him informed of the conditions in and the needs of the locality.

In the course of time it would be advisable for the State to assume the whole, or at least part, of the expense of the district health organization. At present, taking into consideration the State's limited means, it is probably better that the expense be defrayed by the counties comprising the districts. This expense might also be paid in part by money from the school fund, for the reason that much of the time of the district health officer and his public-health nurse would be occupied in the health supervision of the public schools, especially the rural schools within the district.

THE CONTROL OF THE MILK SUPPLY.

The enforcement of State law and regulation relating to the purity of the milk supply has been placed in the hands of the State commissioner of food and drugs, whose division is in the public-service division of the University of Nevada.

The law specifies that it is unlawful to sell impure, adulterated, or unwholesome milk, and provides a fine for violation of not less than $100, or, if the fine is not paid, imprisonment for not less than 30 days.

The law further specifies that milch cows must not be kept in a crowded or unhealthy condition and that they must not be fed on any food that produces impure, diseased, or unwholesome milk, and that milk that has any portion of its cream removed must not be sold except as skim milk.

It is also declared unlawful to add any water to milk or to feed milch cows on distillery waste or garbage. A fine is provided the same as above for any violation of this provision.

The food and drug commissioner has set a standard for milk which requires at least 3.25 per cent of milk fat, 11.75 per cent of total solids, and 8.5 per cent of solids not fat.

A circular has been issued to consumers telling them how to care for milk after it has been delivered by the dealer.

Producing farms are scored, using a score card similar to that in use by the United States Department of Agriculture.

There is but one inspector employed by the food and drug commissioner, who carries on all of the field work entailed in the enforcement of the food and drug law. A few municipalities, through their health officers, are making a special effort to improve the milk supply and with some success. However, most of the municipalities depend entirely upon the efforts of the food and drug commissioner.

As stated in previous reports, it is highly desirable that the sanitary control of milk supplies be placed in the hands of the State board of health. Municipal milk inspectors are practically always a part of the local health department and their work could be made much more effective if they acted in conjunction with the State health department, a body which should be in the position to give advice to, and supervise, the work of the local health organizations.

The sanitary control of the milk supply has two objects in view, the preservation of the purity of milk as such, as well as the purity of products made from milk, as for instance, butter and cheese. From the standpoint of the public health the former is the more important because of the frequent association of a contaminated milk supply with outbreaks of certain of the communicable diseases and the high mortality among infants. The prevention of deaths from this cause is, therefore, essentially a duty of the health department, which is authorized by the legislature to promulgate and enforce regulations for the better preservation of the public health.

It can not be successfully contended that because the statute has intrusted to a particular board the general supervision of the milk supply, by implication it has forbidden the State health department to take such action in regard to milk as may preserve the health of the people of the State. Such action would mean the promulgation and enforcement by the State board of health of regulations not in conflict with those already existing, thereby making it possible to work in close cooperation with such other State organizations as may be striving to secure better and cleaner milk.

APPROPRIATIONS.

The value of the total assessable property in the State for 1915 is estimated at $152,000,000. The tax levy for 1915 is fixed at 56 cents on each $100 of assessed valuation. This would give a revenue of approximately $850,000. If to this amount there be added the sum of $250,000, which is the income from liquor licenses, sundry receipts, etc., the total receipts of the State will be found to be $1,100,000.

Out of this sum there is allowed for public health a total of $8,250 per year, as follows:

The hygienic laboratory	$5,000
The salary of the secretary of the board of health	1,500
General expenses of the board of health	1,750
Total	8,250

This figure represents but three-fourths of 1 per cent of the total receipts of the State, whereas, estimating the amount that should be appropriated annually to public health on the 2 per cent basis, there would be allowed not less than $22,000.

It is thought possible to organize a State department of health for Nevada, capable of carrying on its functions satisfactorily for several years at least, without at present asking for a sum as large as that mentioned above, or $22,000. It is suggested that for the present at least $8,000 a year more than the present appropriation, or $16,250, would enable the State to have a small but efficient State health organization.

The appropriation would then be divided about as follows:

Salary of—	
Secretary	$2,500
Epidemiologist	2,400
Sanitary engineer	2,000
Bacteriologist	1,500
One laboratory attendant	600
Two clerks, at $900 each	1,800
General expenses, including maintenance of laboratory, traveling expenses, stationery, etc	5,450
Total	16,250

This figure represents less than 1½ per cent of the total available revenues, and is extremely small when compared to the State aid to public schools, which amounts to $247,000, or over 22 per cent, and the appropriations to the university, which amount to $145,499 (exclusive of the public-service department), or over 13 per cent of the total available revenues.

RECOMMENDATIONS.

As a result of the study of health administration in the State and a careful consideration of the public health needs, one can but arrive at the conclusion that a well-organized department of health is necessary. This would mean a strengthening of the present board of health and a correlation of the various public health activities which are now being carried on by different State organizations. The present system in Nevada, as well as in many other States, results in making a plaything of the public health rather than a problem to be looked upon seriously.

In order that the necessary reorganization may be accomplished and the State board of health put in a position to conserve the health of the people the following recommendations are made:

1. That the number of members forming the State board of health be increased to five and that the term of office be five years and so arranged that there will be but one change each year.

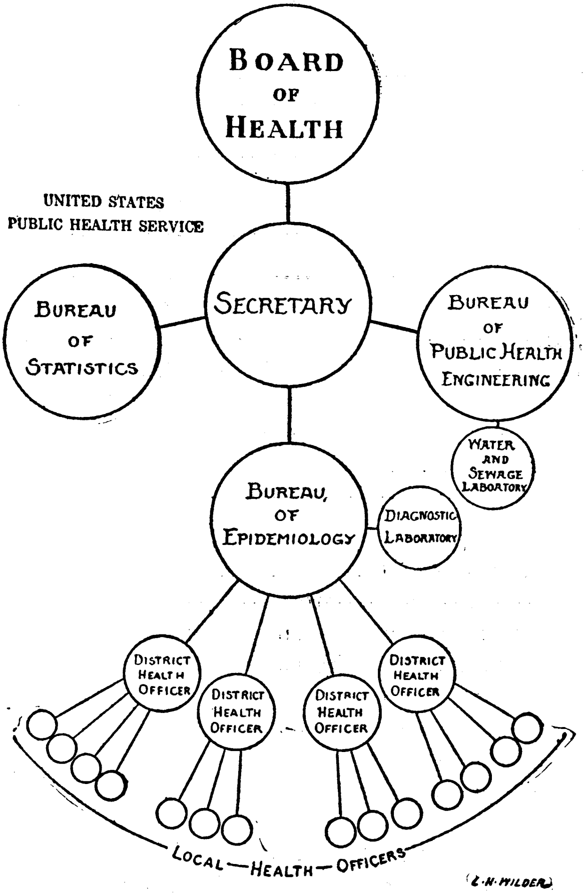
2. That the Secretary be appointed by the board of health to hold office during efficiency and to be discharged only for cause; that he be prohibited from engaging in the practice of medicine or any other business except that in connection with his official work.

3. That the name of the present State health organization be changed to the State department of health.

4. That the present hygienic laboratory and its equipment be transferred from the public-service division of the University of Nevada to the State department of health.

5. That the work of this laboratory be subdivided into two parts, namely, diagnostic and water and sewage.

SUGGESTED ORGANIZATION FOR A STATE DEPARTMENT OF HEALTH IN NEVADA.



6. That for purposes of administration the State department of health be subdivided as follows:

The board of health.
The executive office or office of the secretary.
The bureau of epidemiology.
    The diagnostic laboratory division.
The bureau of sanitary engineering.
    The water and sewage laboratory division.
The bureau of statistics.

7. That the secretary of the board of health be the State health officer, have general charge of the State health department, and act as chief of the bureau of statistics.

8. That additional officers and employees be employed in the State health department as follows:

One epidemiologist.
One sanitary engineer.
One bacteriologist.
One laboratory attendant.
Two clerks.

9. That the epidemiologist be chief of the bureau of epidemiology, and have general supervision over the epidemiological work of the department, the morbidity reports, the diagnostic laboratory, and the district health officers.

10. That the sanitary engineer be chief of the bureau of sanitary engineering and have general supervision over the water and sewage laboratory, and water supplies, sewerage systems, garbage-disposal systems, and disposal of trade wastes within the State.

11. That the bacteriologist be made responsible for the bacteriological work performed in the laboratory.

12. That there be appropriated annually a sum of not less than $16,250 to be spent as follows at the discretion of the board of health:

Secretary	$2, 500
Epidemiologist	2, 400
Sanitary engineer	2, 000
Bacteriologist	1, 500
Laboratory attendant	600
Two clerks	1, 800
General expenses of the department, including the maintenance of the laboratory, traveling expenses, etc	5, 450
Total	16, 250

13. That the State be divided into not less than four districts at the discretion of the State board of health.

14. That in each district there be placed a full-time district health officer.

15. That the district health officers be appointed by the State board of health and made responsible to the secretary of the State board of health; that they be graduate physicians; that they hold their office during efficiency and good behavior, and that they be prohibited from engaging in the private practice of medicine.

16. That they be held responsible for the enforcement of all health laws and regulations and be given general supervision over the work of local health officers, within their respective districts.

17. That the salary and office and traveling expenses of each district health officer and the salary of one public health nurse for each

district be paid proportionately by the counties comprising the district.

18. That the duties of the district health officers be defined by the State health department and include health supervision of schools, the sanitary control of the milk supply, supervision over the communicable diseases, enforcement of the law requiring the registration of births and deaths and the notification of preventable diseases, and dissemination of popular public health information and the like.

19. That the public health nurse perform such duties as may be assigned to her by the district health officer.

20. That county health officers be appointed as under the present law.

21. That more deputy health officers who need not necessarily be physicians be appointed.

22. That both county and deputy health officers, in addition to acting as local and deputy registrars, be regarded as assistants to the district health officers, to act and assist them in emergencies and to keep them informed of the conditions in and the needs of the locality.

23. That when practicable more efficient laws and regulations be enacted for the collection of morbidity reports, the control of disease, the control of water and sewerage systems, and the sanitary control of the milk supply by the State.

PLAGUE-PREVENTION WORK.

HAWAII—PLAGUE PREVENTION.

The following reports of plague-prevention work in Hawaii were received from Surg. Trotter, of the United States Public Health Service:

Honolulu.

WEEK ENDED DEC. 4, 1915.

Total rats and mongoose taken	378
Rats trapped	326
Mongoose trapped	8
Rats shot from trees	43
Rats killed by sulphur dioxide	1
Examined microscopically	312
Showing plague infection	None.
Classification of rats trapped:	
Mus alexandrinus	154
Mus musculus	101
Mus norvegicus	41
Mus rattus	30
Classification of rats killed by sulphur dioxide:	
Mus rattus	1

Classification of rats shot from trees:	
Mus alexandrinus	27
Mus rattus	16
Average number of traps set daily	984
Cost per rat destroyed ....cents	20

Last case rat plague, Aiea, 9 miles from Honolulu, Apr. 12, 1910.

Last case human plague, Honolulu, July 12, 1910.

Last case rat plague, Kukaiau stable, Hawaii, Nov. 25, 1915.

Last case human plague, Honokaa village, Hawaii, Dec. 2, 1915.